WHAT IS CLAIMED IS:

1. A measuring cell comprising at least one tube capable of guiding light, wherein the tube comprises
   a) an input opening,
   b) an output opening and
   c) an inner surface coated with at least one binding agent capable of binding at least one target from a sample,
   wherein the inner surface of the at least one tube is exposed to a fluid sample by flowing the sample into the input opening, through the tube and out from the output opening.

2. The measuring cell of claim 1., wherein the sample is liquid or gaseous.

3. The measuring cell of claim 1., wherein the flow of the sample can be regulated.

4. The measuring cell of claim 3., wherein the flow of the sample is regulated by pressure or by gravity or by capillary forces or by electrophoresis.

5. The measuring cell of claim 1., wherein the ability of the tube to guide light is imparted by
   a) the structure or the physical properties of the inner surface of the tube,
   b) an inherent property of the material used to construct the tube,
   c) features designed within the material building the tube,
   d) features designed within a material surrounding the tube, or
   e) the introduction into the tube of a fluid (e.g. a liquid) with a refractive index high enough to render the tube or the tube with its surrounding material a light guide.

6. The measuring cell of claim 1., wherein the inner surface of the tube may be composed of one or more layers, which layers can be made of an organic or of an inorganic material, or of a combination of both organic and inorganic materials and/or can work as an optical coating.

7. The measuring cell of claim 1., further comprising a material surrounding the tube, which material by its physical properties or by its structure causes the tube to be a light guiding tube.

8. The measuring cell of claim 1., wherein the tube is either a hollow fiber, a photonic bandgap crystal.

9. The measuring cell of claim 1., wherein the tube is filled with an optical fluid (liquid) having a refractive index high enough to render the tube or the tube with its surrounding material a light guide.

10. The measuring cell of claim 1., wherein the at least one capture agent is directly bound to the inner surface of the tube.

11. The measuring cell of claim 1., further comprising an interstitial layer between the at least one capture agent and the inner surface of the tube, wherein the interstitial layer may be a single layer or a multi-layer.

12. The measuring cell of claim 1., wherein the inner surface of the tube is coated with an additional agent that prevents or retards non-specific adsorption and/or non-specific binding of the target and/or other components of the sample.

13. The measuring cell of claim 1., wherein the inner surface of the tube is coated with an additional layer which interacts with the at least one bound target in such a way that it changes the properties of the light guided through the tube.

14. A system comprising:

a) at least one light emitting element;

b) at least one primary light connecting element;

c) at least one measuring cell comprising at least one tube capable of guiding light, wherein the tube comprises

i. an input opening,

ii. an output opening, and

iii. an inner surface coated with at least one binding agent capable of binding at least one target from a sample,

wherein the inner surface of the at least one tube is exposed to a fluid sample by flowing the sample into the input opening, through the tube and out from the output opening;

d) at least one secondary light connecting element;

e) at least one light detecting element and

f) at least one fluid dispensing element;

wherein the at least one fluid dispensing element dispenses the sample to the at least one measuring cell;

further wherein the light emitted by the at least one light emitting element is transmitted to the at least one measuring cell by at least one primary light connecting element;

further wherein the light guided through the at least one measuring cell is transmitted to the at least one light detecting element by the at least one secondary light connecting element;

further wherein the amount of light or the variation of at least one property of the light detected by the at least one light detecting element relates to the amount or to a change of structure and/or properties of the at least one target bound to the at least one capture agent on the inner surface of the at least one tube of the at least one measuring cell.

15. The system of claim 14., where the at least one light emitting element is selected from the group consisting of:

a) a laser;

b) a Light Emitting Diode;

c) a white light source; and

d) a Vertical Cavity Surface Emitting Laser.

16. The system of claim 14., where the at least one light emitting element is a combination or an array of elements selected from the group consisting of:

a) a laser;

b) a Light Emitting Diode;

c) a white light source; and

d) a Vertical Cavity Surface Emitting Laser.

17. The system of claim 14., where the at least one light detecting element is selected from the group consisting of:

a) a Photomultiplier Tube;

b) a camera; and

c) a photodiode.

18. The system of claim 14., where the at least one light detecting element is a combination or an array of elements selected from the group consisting of:

a) a Photomultiplier Tube;

b) a camera; and

c) a photodiode.

19. The system of claim 14., where the at least one primary and the at least one secondary light connecting elements are independently selected from the group consisting of:

a) an optical window;

b) a lenslet array;

c) a spectral filter;

d) a partially reflecting mirror;

e) an intensity filter; and

f) a grating index coupler.

20. The system of claim 14., where one of the at least one primary and the at least one secondary light connecting element or both are also liquid dispensing elements.

21. The system of claim 14., where one of the at least one primary light connecting element and the at least one secondary light connecting element or both are integrated into the measuring cell.

22. The system of claim 14., where the at least one liquid dispensing element is capable of transferring liquid to and from the at least one measuring cell.

23. The system of claim 14. further comprising at least one sample reservoir.

24. The system of claim 14. further comprising at least one disposal reservoir.

25. The system of claim 14., wherein the sample is liquid or gaseous.

26. The system of claim 14., wherein the flow of the sample is regulated.

27. The system of claim 14., wherein the flow of the sample is regulated by pressure or by gravity or by capillary forces or by electrophoresis.

28. The system of claim 14., wherein the ability of the tube to guide light is imparted by

a) the structure or the physical properties of the inner surface of the tube,

b) an inherent property of the material used to construct the tube,

c) features designed within the material building the tube,

d) features designed within a material surrounding the tube, or

e) the introduction into the tube of a fluid (e.g. a liquid) with a refractive index high enough to render the tube or the tube with its surrounding material a light guide.

29. The system of claim 14., wherein the inner surface of the tube may be composed by one or more layer, which can be made of an organic or made of an inorganic material, or of a combination of both organic and inorganic materials and/or can work as an optical coating.

30. The system of claim 14., wherein the tube is either a hollow fiber, a photonic bandgap crystal.

31. The measuring cell of claim 14., wherein the tube is filled with an optical fluid (liquid) having a refractive index high enough to render the tube or the tube with its surrounding material a light guide.

32. The system of claim 14., wherein the at least one capture agent is directly bound to the inner surface of the tube.

33. The system of claim 14., further comprising an interstitial layer between the at least one capture agent and the inner surface of the tube, wherein the interstitial layer may be a single layer or a multi-layer.

34. The system of claim 14., wherein the inner surface of the tube of the measuring cell is coated with an additional layer that prevents or retards non-specific adsorption and/or non-specific binding of the target and/or other components of the sample.

35. The system of claim 14., wherein the inner surface of the tube is coated with an additional layer which interacts with the at least one bound target in such a way that it changes the properties of the light guided through the tube.

36. A method for detecting a target in a sample, which method comprises:

a) introducing a sample to at least one measuring cell using at least one fluid dispensing element, wherein the measuring cell comprises at least one tube capable of guiding light, wherein the tube comprises:
   i. an input opening;
   ii. an output opening;
   iii. an inner surface coated with at least one binding agent capable of binding at least one target of a sample;

   wherein the inner surface of the tube is exposed to a fluid sample by flowing the sample into the input opening, through the tube and out from the output opening;
b) connecting light, from at least one light emitting element, into the at least one measuring cell using at least one primary light connecting element, wherein the light is then guided through the at least one measuring cell where it interacts with the at least one bound target;
c) connecting light, using at least one secondary light connecting element, from at least one measuring cell where it interacted with at least one bound target, to at least one light detecting element;
d) detecting, with at least one light detecting element, the amount of light guided through the tube or the variation of at least one property of the light guided through the tube, wherein the amount of light or the variation of at least one of its properties relates to the amount or to a change of structure and/or properties of the at least one target bound to the at least one capture agent on the inner surface of the at least one tube of the at least one measuring cell;
e) determining or calculating the amount of the at least one target bound to the at least one capture agent.

37. The method of claim 36., wherein the flow of the sample is regulated.

38. The method of claim 36., wherein the flow of the sample is regulated by pressure or by gravity or by capillary forces or by electrophoresis.

39. The method of claim 36., wherein the interaction of the at least one target with any agent and/or any layer bound or immobilized on the inner surface of the tube changes the optical properties of either the bound target or of any agent or any layer bound or immobilized on the inner surface of the tube.

40. The method of claim 36., further comprising the step of washing any unbound target and/or component of the sample from the at least one measuring cell before detecting the guided light.

41. The method of claim 36., wherein the sample undergoes the required number of sample preparation steps before being introduced into the measuring cell.

42. The method of claim 36., wherein the immobilization times are adequately chosen for each step of the method.

43. The method of claim 36., wherein an optical fluid (e.g. a liquid) is introduced into the at least one tube of the at least one measuring cell; said optical fluid having a refractive index high enough to render the at least one tube or the at least one tube with its surrounding material a light guide.

44. The method of claim 43, wherein the optical fluid is introduced at any step of the method or between any step of the method or both.

45. The method of claim 43, wherein the optical fluid is kept in the at least one tube of the at least one measuring cell during the time necessary to perform any desired measurement(s).

46. The method of claim 36., wherein at least one cleaving and/or digesting agent is introduced into the at least one measuring cell, using at least one fluid dispensing element, after the at least one target is immobilized on the inner surface of the at least one measuring cell in a first step, and wherein the at least one cleaving and/or digesting agent modifies the structure of the at least one bound target.

47. The method of claim 36., wherein at least one second binding agent is introduced into the at least one measuring cell, using at least one fluid dispensing element, after the at least one target is immobilized on the inner surface of the at least one measuring cell in a first step, and wherein the at least one second binding agent is captured by the at least one bound target.

48. The method of claim 47., wherein the guided light interacts with either the at least one target or with the at least one second binding agent or any agent or any layer bound or immobilized on the inner surface of the tube before it is detected using the at least one detecting element.

49. The method of claim 47., further comprising a washing step between any immobilization or detection step.

50. The method of claim 47., wherein the at least one second binding has optical properties that enhance detection.

51. The method of claim 47., wherein the at least one second binding agent emits light or absorbs light generated by the at least one light emitting element.

52. The method of claim 47., wherein the interaction of the at least one second binding agent with the at least one bound target and/or with any agent and/or any layer bound or immobilized on the inner surface of the tube changes the optical

properties of the second binding agent and/or of the bound target and/or of any agent and/or any layer bound or immobilized on the inner surface of the tube.

53. The method of claim 47., wherein the immobilization times are adequately chosen for each step of the method.

54. The method of claim 47., further comprising the step of introducing at least one amplification agent to the at least one measuring cell, where the amplification agent binds to the at least one second binding agent.

55. The method of claim 54., further comprising a washing step between any immobilization or detection step.

56. The method of claim 54., wherein the at least one second binding agent and/or the at least one amplification agent has optical properties that enhance detection.

57. The method of claim 54., wherein the at least one second binding agent and/or the at least one amplification agent emits light or absorbs light generated by the at least one light emitting element.

58. The method of claim 54., wherein the interaction of the at least one amplification agent with the at least one bound target and/or with any agent and/or any layer bound or immobilized on the inner surface of the tube changes the optical properties of the amplification agent and/or of the bound target and/or of any agent and/or any layer bound or immobilized on the inner surface of the tube.

59. The method of claim 58., wherein the immobilization times are adequately chosen for each step of the method.

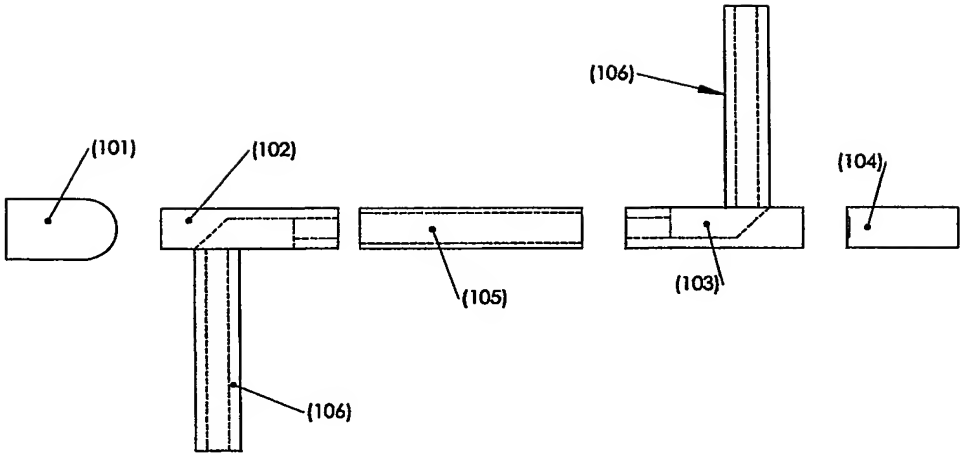

FIG. 1